

# THE REVIEW

DEVOTED TO THE INTERESTS OF THE AMERICAN SOCIETY FOR METALS

Volume XV

APRIL, 1942

No. 4

## Heat Treaters' Night Staged by Four Speakers

Reported by L. E. Wagner  
Chief Industrial Engineer, Providence Gas Co.

Rhode Island Chapter—Utilizing home talent, a "Heat Treaters' Night" was staged for the benefit of 110 members and guests at the March meeting. Chairman M. W. "Doc" Rigdon announced receipt of the replica of the President's bell, and then introduced Past Chairman Neil B. MacLaren as technical chairman of the meeting.

R. F. Harvey, metallurgist at Brown and Sharpe Mfg. Co., gave a very interesting talk on the selection and testing of steel for various purposes. He showed and described a selection chart developed and used by Brown and Sharpe on which each steel used by the company was numbered, its various characteristics such as type and machinability were noted, and the most nearly analogous S.A.E. number given.

### Wheeler Discusses Equipment

Gordon Wheeler, sales manager of the Sentry Co., discussed the various types of heat treating equipment available for high speed steel.

Selection of a furnace must be made with the requirements of the steel and results desired in mind. Mr. Wheeler stressed the value of test samples of the customer's own work to be treated in the furnace under consideration before a decision to purchase is made.

Allan G. Shepherd, Jr., metallurgist of Taft-Pierce Mfg Co., and vice-chairman of the Chapter, reviewed "Heat Treating Procedure", filling his 10-min. assignment in a very able and interesting manner.

Blaming no end of troubles on skimping time in the hardening room, he wanted to know "why wait 8 or 10 weeks for a piece of steel, spend 400 or 500 man-hours on it, and then risk scrapping the machined tool by trying to save 8 or 10 hr. in the heat treating process?"

### Hanson Blasts Erroneous Ideas

He also gave a number of pointers on trouble shooting, where a great many failures, conveniently blamed on the hardener, may be due to design.

(Continued on page 3)

## Oil Industry Has Large Part in Defense Exposition

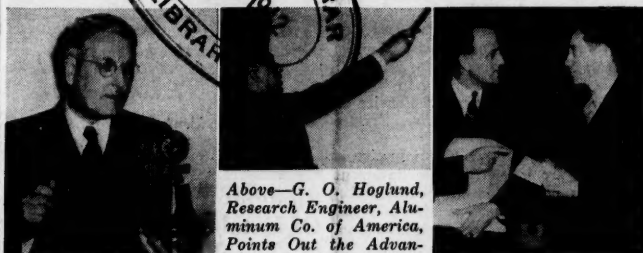
Announcement has been made of the National Defense Exposition—Industrial—Petroleum—Engineering, to be held in the Coliseum, Houston, Texas, May 18 to 24, 1942.

Inasmuch as the oil industry is a major part of the national defense program, this industry will also take an important part in the Exposition. Many manufacturers in the oil industry will place on exhibit equipment and products showing how they are conserving materials and metals.

The Secretary of the Interior, Harold L. Ickes, has tentatively agreed to be present at the Exposition and deliver an address before the oil men.

E. G. Lenzner, who has managed the Oil-World Expositions and who is the originator of the Oil Exposition in Houston, is general manager of the National Defense Exposition.

## Fabrication and Welding of Aluminum Discussed



Above—G. O. Hoglund, Research Engineer, Aluminum Co. of America, Points Out the Advantages and Disadvantages of the Various Methods of Welding Aluminum, at the March 6th Meeting of the Boston Chapter. Left—Chairman George Burnett accepts the bell and gavel recently presented to the Chapter by National President Stoughton. Right—Charles Braglio, research engineer, Aluminum Co. of America, discusses the fabrication of aluminum ordnance parts with a member of the Boston Chapter. (Photographs by Howard E. Handy)

## Five Chapters to Participate in Two-Day Meeting at Penn State April 24 and 25

The final program has been arranged for the Fifth Biennial Inter-Chapter Meeting of the American Society for Metals to be held in State College, Pa., on Friday and Saturday, April 24 and 25. The five participating chapters, with the Penn State Chapter as host, include Philadelphia, Pittsburgh, Lehigh Valley, York, and Southern Tier. The Northwestern Pennsylvania Chapter is also expected to join.

Members of other chapters of the A. S. M. who are interested in the program are cordially invited to attend the meetings and the banquet on Friday evening. The complete program is shown in the adjoining column.

All those attending the technical sessions are requested to register in the Mineral Industries Building. Registration will begin at 9:00 a. m. Friday, April 24.

An informal dinner and entertainment is scheduled for Friday evening.

## Specifications for Bronzes Change to Fit War Needs

Reported by Gerald M. Cover  
Associate Professor of Metallurgy  
Case School of Applied Science

Cleveland Chapter—Coffee talker at the regular monthly meeting on Feb. 2 was Clarence Judd of the Cleveland Press, who has made a specialty of following changes in Cleveland in the war effort. The talk was most interesting, and exhibits of war products and some excellent slides were shown.

The technical speaker was Mr. George K. Dreher, plant manager, Ampeco Metal, Inc., who spoke on "Cast Bronzes—War Materials".

Specifications were discussed in some detail, and examples were given of some mis-uses and some fallacies in specifications. Substitutions can be made in chemical compositions to save other metals, and also to limit the number of alloys.

Mr. Dreher discussed the availability of a number of the metals and brought out the fact that probably certain types of equipment will now be built, not to last a lifetime, but for immediate production.

Slides were shown and applications of the bronzes were discussed, such as resistance to corrosion, non-sparking tools, and pickling equipment.

## Boston Hears Braglio and Hoglund Give Information Useful in Defense Work

Reported by Paul Field  
Materials Engineer, Bethlehem Shipbuilding Division

Boston Chapter—The March meeting was the occasion of the annual joint meeting with the Boston Section of the American Welding Society.

J. F. Foley, Boston Office of the Federal Bureau of Investigation, presented the coffee talk, discussing briefly the history of the F.B.I. from its beginning in 1908. The Bureau has been instrumental in the identification of many missing persons through its extensive fingerprint file, which has increased from approximately 50,000 records in 1924 to 25,000,000 at present.

J. T. Norton, acting as technical chairman, introduced Charles Braglio, development engineer on fabricating, Aluminum Co. of America, who discussed the fabrication and heat treatment of aluminum alloy sheets, bars, and shapes. Mr. Braglio's talk was aimed to assist those fabricators of metals who have only recently attempted the fabrication of aluminum on defense work of various types.

### Same Machines Can Be Used

He pointed out that the usual fabricating machinery can be used and that it is only necessary to remember that lower modulus of elasticity of aluminum and its alloys necessitates greater allowance for "spring-back" when forming these alloys.

He also pointed out the necessity for scheduling severe forming of the heat treated alloys either before, or immediately after, the quenching treatment.

Dr. Norton then introduced G. O. Hoglund, research engineer on welding, also of the Aluminum Co. Mr. Hoglund's talk covered the various methods of welding aluminum and its alloys.

(Continued on page 2)

## W. B. Stout Describes Air Transports of Tomorrow

Reported by Walter G. Patton  
Climax Molybdenum Co.

Detroit Chapter—Two speakers shared honors at the March meeting. William B. Stout, president of Stout Skycraft Corp. and builder of the first all-metal American transport plane, was the coffee talker. The technical speaker was Charles W. Briggs, technical advisor, Steel Founders' Society of America.

Mr. Stout discussed "The Airplane of Today and Tomorrow". His humorous description of modern fool-proof planes and Sikorsky's helicopter and his views of the air transport of tomorrow (eight such planes will replace an average ocean-going freighter) were stimulating and thought-provoking.

The speaker defined an aircraft engine as "a blown-up" crankshaft. He had followed this concept, he explained, in developing a new 100-h.p. aircraft engine that weighed 1 lb. per h.p. and could be built in production for about \$100. The same construction principles could ultimately be made to apply to larger air-cooled engines, he prophesied.

Mr. Briggs' subject, "Welding of Steel Castings and Casting-Weld Construction", is reviewed on page 2.

## Program of Fifth Biennial Inter-Chapter Meeting ASM

Pennsylvania State College  
April 24 and 25, 1942

FRIDAY, APRIL 24

2:00 P. M. Technical Session

Mechanical Property Tests

CHAIRMAN: Col. J. L. Guion

1. *Mechanical Property Tests of Metals and Their Significance*, by R. L. Templin, Aluminum Co. of America.

2. *The Use of Mechanical Property Tests on the Inspection of Materials*, by O. J. HORGER, Timken Roller Bearing Co.

6:00 P. M. Informal Dinner at

Nittany Lion Inn

Address on Research, by Col. R. S. A. Dougherty, Bethlehem Steel Co.

Entertainment Courtesy of C. W. Heppenstall

SATURDAY, APRIL 25

9:00 A. M. Technical Session

Metallurgy of Welding

CHAIRMAN: Col. G. F. Jenks

1. *Influence of Procedure on Welding Metallurgy*, by Charles H. Jennings, Westinghouse Electric & Mfg. Co.

2. *Metallurgy of the Welded Joint*, by W. G. Theisinger, Lukens Steel Co.

## THE REVIEW

Published monthly except July and September by the

**American Society for Metals**  
7301 Euclid Ave., Cleveland, O.

**BRADLEY STOUGHTON, President**  
**HERBERT J. FRENCH, Vice-President**  
**W. H. EISENMAN, Secretary**  
**FRANCIS B. FOLEY, Treasurer**

### Trustees

**E. L. BARTHOLOMEW K. R. VAN HORN**  
**C. Y. CLAYTON N. F. TISDALE**  
**OSCAR E. HARDER, Past President**



Subscriptions fifty cents a year; five cents a copy. Entered as Second Class Matter, July 26, 1936, at the Post Office at Cleveland, Ohio, under the Act of March 3, 1879.

**RAY T. BAYLESS.....Editor**  
**M. R. HYSLOP.....Managing Editor**

**Cleveland, O., April, 1942**  
**Volume XV No. 4**

## Two Executives in Steel Industry Speak

**Reported by H. T. Clark**  
Research Department, Jones & Laughlin Steel Corp.

**Pittsburgh Chapter**—The annual "Sustaining Members' Night" was celebrated on Feb. 12. Representatives of the member companies were guests of the Chapter and were seated at the speakers' table.

The speakers were high ranking executives of the steel industry—R. E. Zimmerman, vice president, research and technology, United States Steel Corp., and H. W. Graham, director of metallurgy and research, Jones & Laughlin Steel Corp., coffee speaker.

Mr. Graham gave an interesting and informative account of the steel industry of South America. He spoke from first-hand information, for he spent several weeks in South America last year as a member of a group of research, industrial and banking executives sponsored by the National Research Council.

Mr. Zimmerman had as his topic "The Critical Range". The rapid expansion of the metals industry during the past two years has been accompanied by many new problems for the metallurgist. The speaker indicated that upon the prompt solution of these problems will depend to a large extent the success of industry in meeting the needs of the nation in its war program.

He discussed several aspects of the work of the steel metallurgist, and concluded with some general remarks on the state of industry both in the emergency and the post-war periods.

## Discuss Fabrication of Al

(Continued from page 1)

and included gas, carbon arc, resistance, and metallic arc welding, as well as aluminum brazing.

The talk was accompanied by a set of slides which illustrated products of the various methods of welding.

Methods for the control of distortion due to welding, involving jigs, braces and tack welding, were illustrated. An especially interesting feature was the comparatively new method of furnace brazing complicated joints in alloys of aluminum.

The program was completed with the showing of the Aluminum Co.'s new film, "Unfinished Rainbows", a color movie depicting the development of aluminum from the early days of Napoleon III to the present time.

## Businessmen Can Aid Employees in Listing Occupational Skills

The national office of the American Society for Metals has received a suggestion from the Federal Security Agency of the Social Security Board that businessmen who are members of the Society can contribute importantly to the success of the Government's plan to list the occupational skills of all men registered under the Selective Service System.

This survey is to be made by the United States Employment Service in cooperation with Selective Service Boards.

One purpose of this questionnaire is to obtain from each man a statement as to his occupation and skills. Accompanying the questionnaire is a list of 225 jobs essential to war production. Every man is asked to check those in which he has had experience or training. The questionnaires must be filled out and returned to the local Selective Service Board.

The questionnaire carries the suggestion that if the man who fills it out needs any help in answering any of the occupational questions, he should go to his employer. Some of the questions may be puzzling to many men, and to some the importance of listing their secondary skills and those they have used on other jobs may be overlooked.

The employer is urged by the United States Employment Service to explain to each worker who seeks his aid the significance of the questionnaire and to help him fill it out properly.

The complete listing of the skills of the Nation's manpower will be of particular advantage to employers because it will help industry to retain men with special occupational ability, as well as to obtain skilled men for war production jobs.

## Hardenability Test Illustrates Application Of Laboratory Procedure to Practical Use

**Reported by David F. Carter**  
Asst. Met., Diamond Chain & Mfg. Co.

**Indianapolis Chapter**—It has been customary to devote one meeting each year to a discussion of a laboratory test procedure and the application of the information obtained from this test to the solution of practical problems.

This year, on March 16, Dr. A. E. Focke, research metallurgist of the Diamond Chain & Mfg. Co., spoke on the various methods of testing the hardenability of steel and the correlation of the results of these tests.

Dr. Focke traced the growth of hardenability through McQuaid and Ehn's tests for austenitic grain size, Shepherd's P-F test, Burns' and Riegel's work on S-A-C ratings, the work of Grossmann and associates in the development of the concept of an ideal critical size and, finally, the Jominy test. He also reviewed the work of the various investigators on the determination of quenching speeds of various media.

In explaining the two concepts of hardenability, surface hardness attainable, and the depth of hardening, Dr. Focke stressed the idea of "critical hardness" to determine the depth of hardening.

The inability of a quenching medium to remove heat from a piece of metal any faster than heat is conducted to the surface was shown strikingly by color movies.

In the discussion after the address, Dr. Focke demonstrated how Grossmann's "Hardenability Slide Rule" could be used to calculate the results

## Officers at Baltimore



**National President Bradley Stoughton and Chairman C. L. Elgert at Baltimore Chapter Officers' Night March 16**

## Stoughton Stresses Role Of Metals in Victory

**Reported by Emil Gathmann, Jr.**  
Gathmann Engineering Co.

**Baltimore Chapter**—National Officers' Night, always a gala affair, convened on March 16 at the Baltimore Engineers Club.

The technical meeting was called to order by Chairman Ray Elgert who presented our competent and witty National Secretary Bill (the Farmer) Eisenman, who took over as technical chairman for the evening.

Bill presented the national president and speaker of the evening, Dr. Bradley Stoughton, dean of engineering at Lehigh University and member of War Production Board. Dr. Stoughton gave a most interesting and informative lecture on metals and their pertinence to the success of our complete victory.

Following Dr. Stoughton's address an educational film by Black and Decker on tool design and tools in the making was shown. The Black and Decker String Orchestra and their star bari-tone furnished fine entertainment.

## Welding Used In Three Ways On Cast Steel

**Reported by G. L. White**  
Editor, Canadian Metals & Metallurgical Industries

**Ontario Chapter**—A subject of importance to producers of castings, those concerned with welding, and those interested in design of equipment was discussed by Charles W. Briggs, Steel Founders Society of America, at a meeting in Hamilton on Jan. 9. The advantages that can accrue from proper methods of design and procedure in the utilization of steel castings and welded structures were indicated clearly.

The welding of steel castings can be divided into three general classifications as follows: (a) Repair, (b) construction of parts by welding of castings to castings, and (c) construction of parts by welding castings to steel forgings or rolled steel plates.

### Use in Repair

In the repair of steel castings welding may be looked upon as a phase of the manufacturing process. With such stringent requirements in many instances for smooth castings, surface defects are a vital consideration and their repair by welding offers important operating economies. Welding, with proper chipping out, effects a most satisfactory repair of defective castings.

In the welding of steel castings problems are similar to those in welding corresponding grades of rolled steel. Certain variations in technique are required with alloy steel.

In some cases, methods other than arc welding are used, including oxy-acetylene and, to a small degree, atomic hydrogen. Welds are frequently radiographed to determine homogeneity.

### Composite Fabrication

In an intricate cast steel structure it is frequently desirable to break the design up into a number of castings which may be welded together. In other instances composite fabrication may be used to improve the quality and appearance of the parts.

A new design of this type may reduce molding problems and eliminate high stresses which would be developed by casting in one section.

Problems arising in steel foundries caused by different rates of shrinkage in certain designs of steel castings may be solved by the change of the design from the single casting to composite structure. In such designs the metal may be placed where the engineer can use it to the best advantage.

Casting weld construction is bringing about the use of steel castings in many situations where they were formerly not used.

The speaker referred to a very logical design procedure followed in a certain plant, where the casting weld design is modified to use more castings as the number of parts to be produced increases.

A number of illustrations of cast-weld construction and composite fabrication were shown.

raised slightly to inhibit grain growth.

Welding quality of ship plate is also a factor. The welding quality of rimmed steel is very good whereas in killed steel some difficulties are encountered.

An interesting feature is the bend test made on ship plate. The test piece must bend 180° over a pin twice the diameter of the test piece without cracking.



## Recent Studies on S-Curves, Grain Size Cited by Davenport

Reported by John R. Dobie

Heat Treat Foreman, American Steel & Wire Co.

Worcester Chapter—On March 11 Mr. E. S. Davenport, metallurgist, U. S. Steel Corp. Research Laboratory, Kearny, N. J., gave an excellent talk on "Isothermal and Cooling Transformation in Carbon and Alloy Steels."

Since Mr. Davenport is a veteran speaker before such gatherings and his important work is so well known, a review of the meeting would be repetitive. He, however, also spoke on some recent studies on effect of grain size and carbide solution in the austenite of typical alloy steels.

He showed conclusively how S-curves form a new framework upon which can be hung isolated and hitherto unrelated facts—in other words, they constitute a sort of portrait of the steel which includes a rational correlation of most of the important factors involved in heat treatment. Yet he added that they are still not complete nor do they explain everything.

Nelson W. Dempsey, technical chairman for the meeting, led the discussion. Notable among the questioners was Mr. Rose of Vanadium-Alloys Steel Corp. He asked the speaker if he was in accord with the findings of Mr. Greninger and his associates at the lower end of the transformation range.

Mr. Davenport replied that he believed there was a great deal of value to be derived from them, but that he and his fellow workers considered that many factors had to be given further study in this region of martensite formation. He pointed out that all of the slides shown during the evening were drawn with open fields on the lower end of the curves.

## Copper for Civilian Use Can Be Cut to Low Levels of '33-'34

Reported by Ralph Winship  
Salesman, Columbia Steel Co.

Puget Sound Chapter—Chairman Joseph Daniels of the University of Washington opened the March 4th meeting with a resounding bong on the new bell, just received from the home office of the Society.

Chairman Daniels gave a brief resume of the progress to date on the W.P.A.C., and remarked that the Chamber of Commerce and other civic groups are very much interested in this work.

E. R. Marble, superintendent for the Tacoma Smelter, American Smelting and Refining Co., gave the main talk entitled "Copper Today".

Mr. Marble gave a very interesting view of production problems under present war conditions as compared to those of yesterday, and endeavored to picture as best he could what the future may hold in store for copper production.

He pointed out that during the lean years of 1933 and 1934 this country was able to get along on a very small amount of copper for their civilian uses, and consequently felt that we can get along quite capably if our civilian uses are again cut to small amounts.

Five reels showing the manufacture of copper products from the ore to the finished goods were shown by courtesy of the United States Bureau of Mines.

A short movie entitled "There's a Job To Be Done", shown through the courtesy of the Allegheny-Ludlum Steel Co., was also of high interest to the members.

## Chicagoans Have Valentine-Victory Dance



Chicago Members and Their Wives and Sweethearts Dance on Valentine's Day

### "V" Symbol Has Double Meaning at Annual Party

Reported by Mrs. Walter T. Olden

Chicago Chapter—Going into the spacious ballroom at the Medinah Athletic Club for the annual dance on Feb. 14, guests were impressed by the beautiful and appropriate theme—a huge "V" for Valentine and Victory. Red, white and blue carried the color scheme through to the table decorations.

Hungry appetites were satisfied by tasty food. However, the "piece de resistance" for each lady proved to be a very practical and patriotic gift—a set of lipsticks on a key chain.

Yes, there was varied entertainment—well received too, but a confidential source told us A. S. Jameson missed a certain bear act from last year's show.

Something new was added to this year's affair. Along with the gaiety, dancing and comradeship, there was a new feeling of responsibility and determination. For the ladies it was Valentine's Day—for the men "V" for Victory.

### Five Chapters Participate in Meeting at Penn State

(Continued from page 1)

The technical sessions will be held in the Art Gallery of the School of Mineral Industries, starting promptly at 2:00 p.m., Friday afternoon. Ladies are cordially invited to the meeting and a special program will be arranged for their interest.

Hotel reservations should be made immediately with the Nittany Lion Inn, State College, Pa., for best accommodations. However, the management of the Inn will make reservations elsewhere in the town as soon as the Inn is completely reserved.

For those who do not wish to travel by bus or by automobile, excellent train service is available to Lewistown for those from the eastern part of the state and to Tyrone for those from the western part. Members should consult their Chapter secretary regarding arrangements with State College transportation companies for conveyances to meet trains, according to requirements.

All arrangements for this meeting have been made through Dr. Charles R. Austin of the Department of Metallurgy, Pennsylvania State College, who should be addressed for further information concerning the program or other arrangements.

### Fishermen and Hunters Favored With Program of Relaxation and Interest

Reported by K. F. Schmidt

Chief Metallurgist, United Engineering & Foundry Co.

Canton-Massillon Chapter—The sudden inability of Earnshaw Cook to deliver his scheduled talk on "Steel Plant Practices," at the March meeting, was naturally disappointing. Mr. Cook was unable to fulfill this engagement both for business reasons and serious illness in his family.

The Program Committee, fulfilling a promise made earlier in the year "to provide a program of relaxation and interest," scheduled Robert Minshall, a member of the Publicity Department of the Division of Conservation of the State of Ohio, whose pictures and talk on the propagation of bass and pheasants followed by some real "deep from the heart" logic on conserving all of our natural resources, including water and forests, was received with ecclesiastical fervor.

Many fishermen and hunters got new tips on where to drop their lines and fire their blunderbusses this coming season. Members of both the local Gun and Pistol Club and Neo Naturalists were guests at the meeting.

A trial "stump the experts" period followed the dinner and true to form it was discovered that experts can be stumped.

### Heat Treaters' Night Is Staged by 4 Local Men

(Continued from page 1)

faulty machining, manipulation or to hydrogenation.

The final turn was by C. E. Hanson of the local staff of Crucible Steel Co. Mr. Hanson gained his experience the hard way, having served his apprenticeship in Brown and Sharpe's hardening room 40 years ago.

He took issue with many erroneous ideas formerly entertained by heat treaters. He said he was early taught that every time you heated a piece of steel you took something away from it. He didn't believe that one, so he hardened and annealed a piece of steel 168 times and still had a good quality of hard steel. He did admit that he started with a cube and finished with a ball!

He gave many instructive pointers gathered from his long experience and

## Traces History Of Silvery Pig Iron in Ohio

Reported by Eugene P. Klier

Graduate Assistant, University of Notre Dame

Notre Dame Chapter—The February meeting was held jointly with the Michiana Chapter, American Foundrymen's Association. The speaker, Bradley H. Booth, metallurgist, The Jackson Iron and Steel Co., discussed "Silvery Pig Iron".

Iron ores were smelted as early as 400 B.C. in India, Ceylon and Japan. The methods used were very crude and an average of only a few pounds of iron a day was produced. From this start the iron industry expanded and spread throughout the world.

About the year 1600 A.D. the widespread use of wood for charcoal used in the blast furnaces depleted the timber supply in England to such an extent that a law was passed prohibiting the cutting of timber for this purpose, within 14 miles of navigable water.

### Iron Industry Moves West

A direct consequence of this law was the movement to set up iron works in the New World. The first successful furnace was built in Massachusetts. From the eastern seaboard the iron industry moved westward, following the rivers on which it depended for transportation.

Large numbers of charcoal furnaces were built and even as late as the World War charcoal iron was still being turned out by southern Ohio furnaces.

Silvery iron was accidentally discovered in Jackson County, where, due to the scarcity of charcoal, some stone coal was substituted for it. The results were that furnace temperatures were increased, more reducing gases were supplied and the silicon content of the iron was increased.

At first this iron was considered to be a cheaper grade than ordinary pig, but it was soon learned that better castings could be made by using increased percentages of scrap with less amounts of silvery iron.

### 50% Less Pig Used

The reason for this was that much higher amounts of silicon in the silvery iron allowed the silicon content of the casting to be maintained when using about 50% less silvery than of ordinary pig iron. The increased scrap gave a finer grained casting.

Of the many furnaces originally engaged in the manufacture of silvery pig iron only two, one of which is the Jisco Furnace of the Jackson Iron & Steel Co., are still in service. Today only the coal and limestone come from the neighborhood of Jackson County. High grade Lake Superior ores have replaced the Jackson County ores.

Numerous slides illustrated the cycle of operations necessary to produce silvery pig iron, and the talk was supplemented with a display of the various grades as well as the materials used in its manufacture.

finished by saying that "in my 40 years experience I have met a lot of metallurgists, but somehow or other I never could agree with them".

The meeting was preceded by dinner at the Minden and a coffee talk by John F. Claydon, sales engineer of the Carborundum Co., entitled "Sparks From the Grinding Wheel". The sparks referred to some very interesting applications of grinding wheels, ranging from grinding cocoa beans and shaping tooth picks to such operations as grinding threads on taps.

# ASM-WAR PRODUCTS ADVISORY COMMITTEES

## Baltimore Chapter ASM-WPAC

J. B. Armstrong, Chief Chemist, Bethlehem Steel Co.; J. B. Bodfish, Aluminum Co. of America; C. L. Elgert, E. F. Houghton & Co., Inc.; A. L. Feld, Director of Research, Rustless Iron & Steel Corp.; A. J. Fisher, Bethlehem Steel Co.; Jesse Hakes, President, Baltimore Tool Works; R. B. Hoffmeister, Crown Cork & Seal Co.; Edwin Horlebin, President, Gibson & Kirk Co.; William J. Hunt, Proprietor, Hunt Mfg. Co.; William Inman, Allegheny Ludlum Steel Co.; Tilman Isaacs, Baltimore & Ohio Railroad; T. C. Jarrett, Research Metallurgical Engineer, American Hammered Piston Ring Division, Koppers Co.; T. R. Koons, Black & Decker Mfg. Co.; J. W. Miller, Metallurgist, Reid-Avery Co.; C. H. Proffen, Purchasing Agent, Charles T. Brandt, Inc.; S. Proctor Rodgers, Industrial Fuel Engineer, Consolidated Gas, Electric Light & Power Co.; F. G. Roemer, Balmar Corp.; A. R. Stargardter, Chief Metallurgist, Eastern Rolling Mill Co.; George J. Stevens, Research Machinist, Rustless Iron & Steel Corp.; Norman B. Tompkins, Crucible Steel Co. of America; R. E. Vining, Supervisor, Methods Department, Reverse Copper and Brass, Inc.

### Write or Phone:

R. C. Dalzell, Chairman  
P. O. Box 2075, Baltimore, Md.  
Gilmor 0222

### ★ ★ ★

## Boston Chapter ASM-WPAC

George H. Burnett, Chapter Chairman  
% Hartel Bros. Co.  
85 W. First St.  
South Boston, Mass.  
SOU 2603

### ★ ★ ★

## British Columbia ASM-WPAC

F. A. Forward, Chapter Chairman  
University of British Columbia  
Vancouver, B. C.

### ★ ★ ★

## Calumet ASM-WPAC

D. R. Cornell, Standard Forgings Co.; J. E. Drapeau, Metallurgist, Metals Refining Co.; Clayton Ebert, Metallurgist, Carnegie-Illinois Steel Corp.; E. P. Epler, Metallurgist, Carnegie-Illinois Steel Corp.; H. G. Gearhart, Metallurgist, Gary Screw & Bolt Co.; I. N. Goff, Consulting Metallurgist; Donald R. Groff, Industrial Engineer, Northern Indiana Public Service Co.; J. W. Haley, Metallurgist, Inland Steel Co.; Roy Huitema, Chemist, Metal & Thermist Corp.; Myron Jones, Metallurgist, Youngstown Sheet & Tube Co.; C. H. Leckberg, Sales, Northern Indiana Public Service Co.; Wm. B. Libert, Metallurgist, Continental Roll & Steel Foundry Co.; G. A. Liljequist, Metallurgist, American Steel Foundry Co.; C. Mahlie, Metallurgist, Inland Steel Co.; W. McCullum, Metallurgist, Youngstown Sheet & Tube Co.; Samuel D. Robinson, Superintendent, U. S. Reduction Co.; K. F. Schaeffer, Metallurgist, Carnegie-Illinois Steel Corp.; Ira A. Stead, Assistant Chief Chemist, Youngstown Sheet & Tube Co.; John Streng, Metallurgist, Inland Steel Co.; F. S. Sutherland, Superintendent, Continental Steel Roll & Foundry Co.; Eric Svedelius, Assistant to Division Superintendent of Maintenance, Carnegie-Illinois Steel Corp.; D. E. Troy, Metallurgist, Inland Steel Co.; H. L. von Ende, Metallurgist, American Sheet & Tin Plate Co.; C. A. Walther, Assistant Chief Inspector, Youngstown Sheet & Tube Co.; Walfrid Warner, Dept. Inspector & Metallurgist, Inland Steel Co.; John A. West, Superintendent, Federated Metals Corp.; D. E. Wilson, Metallurgist, Studebaker Corp.

### Write:

C. E. Chapman, Chairman  
773 Johnson St.  
Gary, Ind.

### Phone:

H. H. Feibabend, Problem Recorder  
Northern Indiana Public Service Co.  
Hammond, Ind.  
Hammond 5200

### ★ ★ ★

## Canton-Massillon ASM-WPAC

E. S. Rowland, Coordinator,  
Assistant Metallurgist  
Timken Steel & Tube Co.

Ervin S. Bower, Metallurgist, Republic Steel Corp.; Frank Cavender, Vice-President, Canton Drop Forging Co.; Hubert A. Grove, Metallurgist, Republic Steel Corp.; E. R. Hamilton, Patent Lawyer, Freese & Bishop; E. R. Johnson, Asst. Engineer, Republic Steel Corp.; H. E. McKimney, Superintendent, Carnegie-Illinois Steel Corp.; E. C. Rogien, Metallurgist, The Hoover Co.; K. F. Schmidt, Metallurgist, United Engineering & Foundry Co.; Paul Snyder, Metallurgist, Climax Molybdenum Co.; Charles A. Stroup, Chief Chemist, American Steel Foundries; Robert M. Wallace, Asst. Supt., Grison-Russell Co.

### Write or Phone:

L. A. Zeitz, Secretary  
East Ohio Gas Co., Canton, Ohio  
Dial 5151

### ★ ★ ★

## Chicago Chapter ASM-WPAC

George A. Spencer, Chairman  
Crown Rheostat & Supply Co.  
1910 Maypole Ave.  
Chicago, Ill.

**B**ECAUSE so many metal problems are involved in war-time production, the local chapters of the American Society for Metals have organized War Products Advisory Committees as a free advisory service for the metal producing and metal working industries. These ASM-War Products Advisory Committees will meet regularly. Every manufacturer of war products is invited to avail himself of these meetings.

If you have a problem, do not hesitate to get in touch with your local committee. Write or phone the coordinator, chairman, secretary or problem recorder as indicated in the list of committees on this page.

The work of the ASM-War Products Advisory Committees is solely a contribution to present war-time efforts. You need not be a member of the American Society for Metals to obtain this service. You will not be solicited for membership. This is a sincere effort on the part of the chapters of the ASM to make a valuable contribution to "Ultimate Victory".

## Cleveland Chapter ASM-WPAC

Hugh E. Brown, Director of Research, W. S. Tyler Co.; H. D. Churchill, Associate Professor of Mechanical Engineering, Case School of Applied Science; A. C. Denison, President, Fulton Foundry & Machine Co.; Joseph V. Edmonson, Metallurgist, Cleveland Twist Drill Co.; A. C. Furman, Sales Engineer, Cleveland Electric Illuminating Co.; L. W. Kempf, Research Metallurgist, Aluminum Co. of America; Waldemar Naujoks, Chief Engineer, Steel Improvement & Forge Co.; H. B. Pulsifer, Assistant to President, American Metal Treating Co.; George Sachs, Professor of Metallurgy, Case School of Applied Science; E. W. P. Smith, Consulting Engineer, Lincoln Electric Co.; J. R. Thompson, Assistant Manager, Metallurgical Division, American Steel & Wire Co.; A. M. Thurston, Combustion Engineer, East Ohio Gas Co.

**ADVISORS TO THE COMMITTEE:** H. C. Atkins, W. F. Aylard, R. H. Barnes, G. A. Barth, W. E. Benninghoff, M. L. Burchfield, Walter Clark, R. H. Danforth, W. A. Dean, Hugh Dryer, D. M. Gurney, P. J. Gysi, H. J. Harach, C. L. Harvey, L. F. Herron, E. R. Johnson, D. E. Lawson, M. A. Monaghan, E. M. Murphy, A. E. R. Peterka, H. L. Redhead, John Remesch, W. Rodgers, E. L. Rolf, H. J. Rowe, T. D. Stay, E. E. Thum, M. A. Tran, K. R. Van Horn, H. E. Wetzel, S. W. Whitelaw, J. E. Wilkey.

### Write or Phone:

William K. Stewart, General Chairman  
American Institute of Bolt, Nut  
& Rivet Manufacturers  
Room 1550 Hanna Building  
Cleveland, Ohio  
Cherry 4112

### ★ ★ ★

## Columbus Chapter ASM-WPAC

R. E. Christin, Metallurgist, Columbus Bolt Works Co.; B. W. Gonsler, Supervisor of Non-Ferrous Metallurgy, Battelle Memorial Institute; D. J. Demore, Professor of Metallurgy, Ohio State University; E. K. Fry, Process Supervisor, Curtis Wright Corp.; S. L. Hoyt, Technical Advisor, Battelle Memorial Institute; L. R. Jackson, Assistant Supervisor, Physics Division, Battelle Memorial Institute; Charles Leibenberger, Superintendent, Columbus Sucker Rod Co.; C. H. Lorig, Supervisor of Process Metallurgy, Battelle Memorial Institute; L. H. Marshall, President, L. H. Marshall Co.; G. N. Moffat, Associate Professor, Mechanical Engineering Department, Ohio State University; C. E. Sims, Supervisor of Ferrous Metallurgy, Battelle Memorial Institute; Charles S. Thomas, Metallurgist, Jeffrey Mfg. Co.; O. E. Harder, Assistant Director, Battelle Memorial Institute.

### Write or Phone:

J. W. Barnett, Chairman  
Battelle Memorial Institute  
Columbus, Ohio  
University 4193

### ★ ★ ★

## Dayton Chapter ASM-WPAC

James W. Carl, Chairman  
Superintendent  
Simonds Worden White Co.

Earl C. Adkins, The Sheffield Corp.; G. A. Baker, Sales, Duriron Co., Inc.; Stewart De Poy, Delco Products Division; H. W. Faulkender, Factory Manager, Lau Blower Co.; L. L. Jaffe, Metallurgist, Frigidaire Division; R. L. Moncrief, Metallurgist, Frigidaire Division; John Moser, Simonds Worden White Co.; George J. Oswald, Metallurgist, National Cash Register Co.; S. R. Prance, Technical Director, Inland Manufacturing Division; Siebert Schneider, Frigidaire Division; H. H. Walther, Research Metallurgist, Dayton Steel Foundry Co.

### Write or Phone:

I. J. Rapp, Secretary  
Dayton Power & Light Co.  
Dayton, Ohio—Fulton 3414

### ★ ★ ★

## Detroit Chapter ASM-WPAC

Roy W. Roush, Chairman  
Timken-Detroit Axle Co.  
Lafayette 3600

V. A. Crosby, Chapter Secretary  
Climax Molybdenum Co. of Michigan

## Golden Gate ASM-WPAC

S. H. Edwards, Chairman  
Industrial Steel Treating Co.  
Oakland, Calif.

L. Anderson, Bethlehem Steel Co.; J. M. Bacigalupi, Merchant Calculating Machine Co.; V. P. Beauchamp, Balfour, Guthrie & Co., Ltd.; I. Birmingham, E. F. Houghton & Co.; B. B. Cook, U. S. Navy Inspector; J. V. Coulter, Coulter-Sibbett Steel Co.; G. E. Dalbey, Abbot A. Hanks, Inc.; E. H. Davis, American Can Co.; J. Dorn, University of California; J. F. Driscoll, Rincón Foundry Co.; S. H. Edwards, Industrial Steel Treating Co.; A. J. Hales, Hersey Inspection Bureau; T. S. Hersey, Hersey Inspection Bureau; E. S. Hudson, Alameda Air Base; W. B. Kennedy, Columbia Steel Co.; K. V. King, Standard Oil Co. of Calif.; P. MacCaffrey, General Metals Co.; E. E. Morse, Consulting Metallurgist; S. L. Palmer, Federated Metals Corp.; D. R. Rowe, Friden Calculating Machine Co.; W. W. Stevens, Jr., Electro Metallurgical Sales Corp.; G. E. Troxell, University of California; F. E. Twining, Twining Laboratory; G. L. von Planck, Columbia Steel Co.; W. P. Wallace, Columbia Steel Co.

G. A. Nelson, Secretary and Coordinator  
2842 Parker St., Berkeley, Calif.  
Berkeley 2906W

### ★ ★ ★

## Hartford Chapter

**Emergency Materials Committee**  
Werner H. C. Berg, Chief Metallurgist, Whitney Chain & Mfg. Co.; Henry J. Chapin, Metallurgist, Peck, Stow & Wilcox Co.; John A. Comstock, Metallurgist, Pratt & Whitney Aircraft Div.; F. P. Harter, District Sales Manager, Universal-Cyclops Steel Corp.; L. A. Lanning, Asst. Plant Manager, New Departure Division; A. D. Nemser, Metallurgist, International Nickel Co.; Erwin A. Sanford, Chief Chemist, Henry Southern Engineering Co.; H. W. Staples, Chief Metallurgist, Bristol Brass Corp.; Joseph L. Stone, Field Metallurgist, Union Drawn Steel Division.

### Write or Phone:

R. W. Woodward, Chairman  
Underwood Elliott Fisher Co.  
56 Arbor St., Hartford, Conn.  
Hartford 3-6215

### ★ ★ ★

## Indianapolis ASM-WPAC

David F. Carter, Asst. Metallurgist, Diamond Chain & Mfg. Co.; G. F. Davis, Salesman, E. F. Houghton & Co.; W. E. Ellsworth, Salesman, Claud S. Gordon Co.; H. H. Lurie, Chief Metallurgist, Cummins Engine Co.; Raymond H. Stewart, Chief Chemist, Prest-O-Lite Co., Inc.; I. R. Wagner, Manager, Electric Steel Castings Co.

### Write or Phone:

Arthur E. Focke, Coordinator  
Diamond Chain & Mfg. Co.  
Indianapolis, Ind.  
Riley 9311

### ★ ★ ★

## Milwaukee Chapter ASM-WPAC

M. A. Scheil, Chairman

A. O. Smith Corp.

E. G. Guenther, Secretary

Chief Chemist and Metallurgist

Wisconsin Motor Corp.

John J. Chyle, Research Engineer, A. O. Smith Corp.; Walter W. Edens, Engineer, Ampco Metal, Inc.; E. G. Guenther, Chief Chemist & Metallurgist, Wisconsin Motor Corp.; J. Fletcher Harper, Globe Union Mfg. Co.; C. A. Krause, Anderson Laboratories; W. B. Leyda, A. O. Smith Corp.; E. L. Roth, General Manager, Motor Castings Co.; Carl F. Scheil, Asst. Sales Manager, Columbia Tool Steel Co.; John A. Webber, Production Manager, Interstate Drop Forge Co.; E. J. Wellauer, Chief Metallurgist, The Falk Corp.; David Zuege, Metallurgist, Stryer Steel Castings Co.

### Write or Phone:

Irvin J. Ott, Problem Recorder  
Milwaukee Association of Commerce  
611 N. Broadway—Room 511  
Milwaukee, Wis.  
Daly 2935

## New Haven ASM-WPAC

Mr. Bierhelm, Heppenstall Co.; J. Bona, Bristol Co.; Robert M. Brick, Instructor of Metallurgy, Yale University; John L. Christie, Metallurgical Manager, Hand & Harman; Donald K. Crampton, Director of Research, Chase Brass & Copper Co.; J. W. Dearborn, J. W. Dearborn Co.; F. B. Diana, Works Manager, Whipple & Choate Co.; A. D. Eplett, Metallurgical Engineer, Manning, Maxwell & Moore, Inc.; John R. Freeman, Technical Manager, American Brass Co.; R. E. Hicks, Chemist, Yale & Towne Mfg. Co.; C. N. Hoagland, Research & Development Engineer, The Bullard Co.; Ira T. Hook, Welding Research Engineer, American Brass Co.; J. Imperati, American Brass Co.; C. B. Kentnor, Jr., Sales Engineer, W. S. Rockwell Co.; Henry G. Keshel, Steel Metallurgist, Chase Brass & Copper Co.; R. Kilgore, Sales Representative, Weirton Steel Co.; J. Mitchell, Farrell-Birmingham Co.; Alan Morris, Director of Research, Bridgeport Brass Co.; Harold C. McKay, Jr., Chief Metallurgist, Fairfield Foundry, Aluminum Co. of America; G. B. Olson, Tool Engineer, General Electric Co.; Ray Porter, Sales Representative, Heppenstall Co.; Lloyd Raymond, Metallurgist, Slager Mfg. Co.; T. J. Russell, Sales Representative, Westinghouse Electric & Mfg. Co.; D. F. Sawtelle, Metallurgist, Malleable Iron Fittings Co.; Stuart Sinclair, Assistant Metallurgist, Geometric Tool Co.; Haig Solakian, A. F. Holden Co.; Sam C. Spalding, Metallurgical Engineer, American Brass Co.; F. E. Stockwell, Lubrication Engineer, Colonial Beach Oil Co.; Ray Tierney, Treasurer, Storrs Raymond, Metallurgist, W. N. Van Tassel, Metallurgist, Scovill Mfg. Co.; M. J. Weldon, Metallurgist, Henry G. Thompson Son Co.; M. A. Williamson, Eastern Machine Screw Co.

**Write or phone the problem recorder in your district, as follows:**

Ansonia Area: F. H. Tomlinson, Farrell-Birmingham Co., Inc., Ansonia 3600. Bridgeport Area: J. C. Huston, Bridgeport Gas Light Co., Bridgeport 3-3161. New Haven Area: C. E. Little, Koppers Conn. Bridgeport, New Haven 1-1681. Norwalk Area: R. C. Peck, The E. H. Hotchkiss Co., Norwalk 6-1664. Waterbury Area: Robert C. LeMay, Connecticut Light & Power Co., Waterbury 3-0131.

### ★ ★ ★

## New Jersey ASM-WPAC

**DIVISION MANAGERS AND ASSISTANT DIVISION MANAGERS:** T. L. Coughlin, Assistant Chief Metallurgist, Hyatt Bearings Division, General Motors Corp.; C. S. Cronkright, Public Service Co.; E. S. Davenport, Assistant Metallurgist, U. S. Steel Corp. Research Laboratories; John Fancher, Superintendent, Landon P. Smith, Inc.; C. W. Hassmann, Metallurgist, Hyatt Bearings Div.; W. L. Hults, General Superintendent, Schnef Bros. Inc.; W. G. Jackson, Development Engineer, Hyatt Bearings Div.; Stanley Lindstrom, Assistant American Cast Co.; R. J. Metzler, Engineer, Bendix Aviation Corp.; Mullin, Foreman, Curtis-Wright Propeller Division; F. P. Peters, Assistant Editor, Metals & Alloys; J. W. Queen, Jr., Metallurgist, J. T. Ryerson & Sons, Inc.; R. W. Research Laboratory, U. S. Steel Corp.; Eric Ruckelshaus, Curtis-Wright Propeller Div.; H. F. J. Skarbeck, Chief Draftsman, Breeze Corp.; S. Skowronski, Research Engineer, International Smelting & Refining Co.; R. W. Thorne, Salesman, Bennett Insured Steel Treating Co.; N. E. Woldman, Metallurgist, Eclipse Aviation Division, Bendix Aviation Corp.

**DIVISION MANAGERS:** F. Benedict, A. Bornemann, J. A. Bukowski, D. A. Butler, L. A. Cigliano, B. Clements, Elmer Cook, J. A. Doyle, William Engelhard, E. H. Engelle, Frank England, H. M. Foster, A. P. Guehring, J. H. Halsley, V. Hansel, William Hausmann, J. H. Heath, O. Henderson, Hugo Hornbruck, E. D. King, William Klauke, F. A. Pease, C. H. Reiss, J. Reiss, Joseph Sammon, P. E. Tinnerman, C. J. Wiegell, J. J. Wyral.

### Write or Phone:

John F. Wyzalek, Chairman  
Hyatt Bearings Division  
Harrison, N. J.  
Harrison 6-3700

### ★ ★ ★

## North West ASM-WPAC

Charles G. Adams, Managing Partner, Twin City Die Castings Co.; H. H. Blois, Metallurgist, Minneapolis Electric Steel Castings Co.; A. J. Bryant, Tool Engineer, Northern Pump Co.; Ralph L. Dowdell, Professor of Metallurgy, University of Minnesota; T. P. Hughes, Assistant Professor of Mechanical Engineering, University of Minnesota; Gordon W. Johnson, Metallurgist, Minneapolis-Moline Research Lab.; W. E. Johnston, President, Johnston Mfg. Co.; T. L. Joseph, Professor of Metallurgy, University of Minnesota; Nathan Levinsohn, Foundry Metallurgist, Minneapolis-Moline Research Laboratory; Leonard Mayerson, Metallurgist, Minneapolis-Honeywell Regulator Co.; J. D. Mooney, President, Auto Engine Works, Inc.; R. B. Niles, Vice-President, Marquette Mfg. Co.; LeRoy Owen, Sales Representative, Carpenter Steel Co.; S. J. Pfaff, Sales Representative, Columbia Tool Steel Co.; George C. Land, H. M. Foster, A. P. Guehring, J. H. Halsley, V. Hansel, William Hausmann, J. H. Heath, O. Henderson, Hugo Hornbruck, E. D. King, William Klauke, F. A. Pease, C. H. Reiss, J. Reiss, Joseph Sammon, P. E. Tinnerman, C. J. Wiegell, J. J. Wyral.

### Write or Phone:

Alexis Caswell, Coordinator  
200 Builders Exchange Bldg.  
Minneapolis, Minn.  
Atlantic 6401



# ASM-WAR PRODUCTS ADVISORY COMMITTEES

## New York ASM-WPAC

Robert G. Humphrey, District Coordinator  
Engineer, Technical Staff  
Bell Telephone Laboratories

Ellis Blade, Consulting Engineer, John Chatillon & Sons; G. M. Bouton, Engineer, Bell Telephone Laboratories; J. Z. Briggs, Assistant Metallurgist, Crucible Steel Co. of America; J. L. Cahill, Engineer, U. S. Navy Yard; F. H. Clark, Metallurgist, Western Union Telegraph Co.; G. L. Craig, Research Engineer, Calumet & Hecla Cons. Copper Co.; C. Davidson, Chemical Engineer, Lucius Pitkin, Inc.; Leo Edelson, Handy & Harman; A. P. Gagnebin, Research Metallurgist, International Nickel Co.; A. Gobus, Metallurgist, International Nickel Co.; Charles Hardy, President, Charles Hardy, Inc.; F. Heinzelman, Jr., Vice-President, Fred Heinzelman & Sons, Inc.; George O. Hiers, Metallurgist, National Lead Co.; T. N. Holden, I. Beckman Steel, New York; J. A. Jessco, Manager Tube Division, Victor Metal Products Corp.; R. C. Jordan, Sales, Crucible Steel Co. of America; E. H. Klein, New Jersey Zinc Co.; H. M. Malm, Engineer, Callite Tungsten Corp.; W. C. Mearns, Research Metallurgist, International Nickel Co.; T. D. Parker, Metallurgical Engineer, Climax Molybdenum Corp.; R. E. Renshaw, Vice-President, Powder Metals and Alloys, Inc.; W. C. Reid, Vice-President, Metallizing Engineering Co.; H. R. Swartley, Sales Representative, Ohio Crankshaft Co.; J. W. Sands, Metallurgist, International Nickel Co.; J. A. Scheick, Sales Engineer, Bausch & Lomb Optical Co.; J. N. Schmucker, Aluminum Co. of America; A. K. Seaman, Engineer, The Linde Air Products Co.; E. L. Vally, 233 Broadway; J. S. Vanick, Metallurgist, International Nickel Co.; E. M. Wise, Staff Advisor, International Nickel Co.

Write or Phone:

G. W. Strahan, Chairman  
International Nickel Co.  
67 Wall St., New York City  
Whitehall 4-1000

## Oregon Chapter ASM-WPAC

C. G. Chisholm, Columbia Steel Co., Portland; S. H. Graf, Head, Department of Mechanical Engineering, Oregon State College; G. E. Healy, Industrial Sales Engineer, Portland Gas and Coal Co.; D. J. McNeil, Chief Engineer, Willamette Hystr Co.; R. E. Neils, Associate Engineer, United States Forest Service; A. J. P. Vice-President, Oregon Brass Works; Randolph Simpson, Chief Metallurgist, Electric Steel Foundry Co.; C. E. Thomas, Professor of Engineering Materials, Oregon State College; W. J. Ulrich, Secretary, Pacific Portland Cement Co.; A. L. Wallace, Production Engineer, Iron Fireman Mfg. Co.

Write or Phone:

Norton L. Peck, Chairman  
303 N. W. Park Ave., Portland, Ore.  
BR. 0695

## Peoria Chapter ASM-WPAC

E. E. Alexander, Supt. Heat Treating, Caterpillar Tractor Co.; J. W. Bridwell, Asst. Chief Engineer, Caterpillar Tractor Co.; T. J. Connor, Vice-Pres. Manufacturing, Caterpillar Tractor Co.; C. A. Davis, Jr., Purchasing Dept. Engineer, Caterpillar Tractor Co.; M. D. Johnson, Chief Inspector, Caterpillar Tractor Co.; J. A. MacDonald, Chief Tool Eng., Caterpillar Tractor Co.; A. V. Martens, President, Pekin Foundry and Mfg. Co.; J. E. Nordstrom, Research Metallurgist, Keystone Steel and Wire Co.; G. C. Riegel, Chief Mfg. Engr., Caterpillar Tractor Co.; L. E. Roark, Secretary, Peoria Manufacturers' Association; L. E. Roby, Sr., Owner, Malleable Foundry Co.; A. F. Siepert, Dean of Education, Bradley Polytechnic Institute; R. S. Simmons, Chief Metallurgist, Keystone Steel and Wire Co.; D. P. Sommer, Vice-President, Keystone Steel and Wire Co.; F. F. Streibich, Superintendent, Herschel Mfg. Co.; H. L. Walzer, Acting Head, Dept. of Mining and Met. Engineering, University of Illinois; J. G. Weiss, Chief Inspector, Keystone Steel and Wire Co.; D. J. Wright, Supervisor, Heat Treating Dept., Caterpillar Tractor Co.

Write or Phone:

Glenn G. Thiersch, Coordinator  
213 South Jefferson St., Peoria, Ill.  
Peoria 6197

## Philadelphia Chapter ASM-WPAC

Walter Candlin, Salesman, Crucible Steel Co. of America; Howard Hutchinson, Superintendent, Philadelphia Steel & Wire Corp.; Charles B. Irmer, Chief Draftsman, Leeds & Northrup Co.; T. Holland Nelson, Consulting Metallurgist; Leland R. Van Wert, Metallurgist, Leeds & Northrup Co.

Write or Phone:

Joseph Sharpe, Chairman  
Sharpe & Flynn, Inc.  
Stokely Ave. above Roberts Ave.  
Philadelphia, Pa.—Dav. 5200

## Pittsburgh Chapter ASM-WPAC

H. V. Beasley, Field Office Manager, Development and Research Division, International Nickel Co.; A. D. Beeken, Metallurgical Engineer, Vulcan Crucible Steel Co.; Y. J. Bruce, Metallurgical Engineer, Jones & Laughlin Steel Corp.; A. M. Cox, Metallurgical Engineer, Pittsburgh Commercial Heat Treating Co.; R. W. Emerson, Metallurgist, Pittsburgh Pipe & Equipment Co.; R. C. Heaslett, General Metallurgist, Continental Roll & Steel Foundry Co.; Morton M. Jenkins, Metallurgist, Pittsburgh Forgings Co.; William Laird, Superintendent, Brass Foundry, Westinghouse Electric & Mfg. Co.; A. C. Meyers, Metallurgist, Williams &

Co. Robert Sergeson, Chief Metallurgist, Park Works, Crucible Steel Co. of America; R. P. Sues, President, Screw Machine Specialty Co.; R. L. Templin, Chief Engineer of Tests, Aluminum Co. of America.

Write or Phone:

Albert W. Demmler, Chairman  
Vanadium Corp. of America  
Pittsburgh, Pa.  
Walnut 4405

## Rockford Chapter ASM-WPAC

J. N. Harris, General Chairman  
Rockford Drop Forge Co.  
Rockford, Ill.  
Phone M.188

L. R. Foote, Coordinator  
Room 311, Gas & Electric Bldg.  
Rockford, Ill.  
Phone M.6900

## Schenectady ASM-WPAC

Mrs. C. B. Brodie, Chapter Secretary  
Research Laboratory  
General Electric Co.  
Schenectady 4-2211, Ext. 4295

## Syracuse Chapter ASM-WPAC

C. T. Patterson, Coordinator  
Metallurgical Engineer  
Solvay Process Co.

R. L. Manier, Industrial Engineer, Central New York Power Corp.; C. H. Parmelee, Metallurgist, Onondaga Pottery Co.; R. A. Shattuck, Metallurgist, Sanderson Works, Crucible Steel Co. of America; F. F. Adkinson, Metallurgist, New Process Gear Corp.; H. R. Wegner, Metallurgist, Syracuse Heat Treating Corp.; Walter Bolton, President, Rock Bit Co.; M. Smith, Industrial Engineer, Central New York Power Corp.; C. C. Edelen, Sales Engineer, Surface Combustion Corp.; W. J. Murray, Sales Engineer, Surface Combustion Corp.; La. R. O. Industrial Engineer, Utica Gas & Electric Corp.; J. D. Boedicker, Industrial Engineer, New York State Electric & Gas Corp.; R. K. Warren, Metallurgist, Sanderson Works, Crucible Steel Co. of America; H. J. Stagg, Metallurgist, Crucible Steel Co. of America; A. R. Gough, Sales Engineer, Brace-Mueller-Huntley, Inc.; C. R. Wade, Metallurgist, Halcomb Steel Division, Crucible Steel Co. of America; Myers, Engineer, Syracuse War Products Board; R. Schemp, Metallurgist, Crucible Steel Co. of America; J. Buchenau, Superintendent, Globe Malleable Co.; E. L. Bishop, President, Globe Malleable Co.; J. Ward, Die Designer, Globe Malleable Co.; E. H. Van Order, Vice-President, Henry & Allen Co.; E. Gallager, General Manager, Hammond & Irving, Inc.; F. A. Porter, Precision Castings Co.; E. G. White, Plant Engineer, Crouse-Hinds Co.; Arthur E. Thurber, Onondia Ltd.; Ray Schultz, Onondia Ltd.; W. G. Slack, Metallurgist, Halcomb Steel Division, Crucible Steel Co. of America; P. J. Honold, Sales Engineer, Brace-Mueller-Huntley, Inc.; F. C. Wheeler, Chemist, Kinman & Wheeler; S. B. Voorhees, Metallurgist, International Harvester Co.; H. H. Matting, Metallurgist, American Locomotive Co.; H. Bentley, Welding Engineer, Bentley Co.; K. W. Robertson, Sales Engineer, Brown Instrument Co.; W. L. Kimber, Sales Engineer, Leeds & Northrup Co.; George O. Miller, Sales Engineer, C. J. Tagliabue Mfg. Co.; A. H. Lewis, Metallurgist, Crucible Steel Co. of America; R. H. Scholtz, Metallurgist, Onondia, Ltd.; F. P. Hall, Ceramic Engineer, Pass & Seymour.

Write or Phone:

War Production Board  
Starrett-Syracuse Bldg.  
Syracuse, N. Y.  
Syracuse 3-9184  
J. R. MacAllister, Recorder

## Texas Chapter ASM-WPAC

W. S. Abbott, Metallurgist, Hartwell Iron Works; Herbert Allen, Chief Engineer, Cameron Iron Works; B. H. Andrews, Plant Superintendent, General Metals Corp.; R. F. Arnold, District Engineer, Linde Air Products Co.; L. H. August, District Engineer, Hughes Tool Co.; A. Backer, Production Manager, Cameron Iron Works; H. H. Brien, Sales Manager, Texas Foundry, Inc.; W. E. Burndrett, Chief Inspector, Hughes Tool Co.; L. M. Cole, District Manager, Warner & Swasey Sales Co.; H. E. Collins, Foreman of Tool Room, Hughes Tool Co.; J. Dee, Owner, Dee Brass Foundry; E. E. Dillman, Engineer, Engineers & Fabricators; F. E. Dory, Proprietor, Engineering Sales Co.; Herbert Elmer, Foundry Superintendent, Dedman Foundry; W. L. Fairbanks, Chief Tool Engineer, Reed Roller Bit Co.; R. M. Garrison, Chief Engineer, Mission Mfg. Co.; E. Gentry, Shop Superintendent, Mission Mfg. Co.; C. C. Goolsbee, Welding Engineer, Reed Roller Bit Co.; W. H. Greer, Inspector, Southwestern Laboratories; W. W. Hampton, Production Manager, Hughes Tool Co.; T. D. Ketchum, Proprietor, Industrial Welding and Testing Laboratory; R. B. Kinzbach, Vice-President, Kinzbach Tool Co.; W. A. Kuenemann, Industrial Engineer, Houston Light & Power Co.; J. M. Kugler, Forge Superintendent, Southern Pacific Lines; Karl E. Luger, Metallurgist, Carnegie-Illinois Steel Corp.; R. E. McArdle, Proprietor, McArdle Equipment Co.; C. E. Olson, President, Gearcraft Mfg. Co.; L. M. Poff, Inspector, Byron Jackson; J. M. Robertson, Industrial Engineer, Houston Natural Gas Corp.; D. K. Robinson, Industrial Engineer, Houston Light & Power Co.; F. A. Rudman, Manager, Dixie Elec-

## Why Electroplate? Special Features Can Be Attained Not Otherwise Possible

Reported by R. E. Christin  
Metallurgist, Columbus Bolt Works

Columbus Chapter—The March 10th meeting proved its attractiveness by beginning with the sound and color movie on "Heat Treating Hints" prepared by the Lindberg Steel Treating Co. of Chicago. A 45-min. show, it illustrated the various methods of avoiding warping and cracking of dies and tools during the hardening process.

The second part of the program, entitled "Why Electroplate?" was discussed by Dr. Charles L. Faust of Battelle Memorial Institute. The most direct reply to the topic in question was stated to be "that electroplating produces results that are not so readily attained, if at all, by other methods of metal working".

The special features attainable were pointed out and illustrated by representative slides. Electrodeposition of metals has now reached a high state of perfection. As a result, new horizons in applications have been opened up and a number of these were discussed.

Recent improvements in securing well-bonded plate have greatly extended the utility of electroplating in special surfacing for wear, erosion and corrosion resistance. Forming or "cold casting" by electrodeposition of metals offers many advantages.

The possibilities of electroplating have been scarcely touched, and new successes are being rapidly achieved. The discussion which followed was proof of the interest in this subject.

## CONTROLLED ATMOSPHERES

A new book based on 1941 Metal Congress Symposium at

Pre-Publication Price

\$2.50 (after May 1—\$4.00)

235 pages . . . 84 illustrations . . . 6 x 9 . . . red cloth binding

Until May 1st, ASM members may reserve a copy of this valuable text on controlled atmospheres at a special pre-publication saving. The book includes ten lectures presented at the Philadelphia Metal Congress Symposium on Controlled Atmospheres by outstanding men in this field.

Order your copy today at this special pre-publication price!

### TABLE OF CONTENTS

- Fundamental Features of Controlled Atmospheres—By H. W. Gillett and R. W. Gonsler, Battelle Memorial Institute.
- Chemical Equilibrium as a Guide in the Control of Furnace Atmospheres—By J. B. Austin and M. J. Day, U. S. Steel Corp.
- Prevention of Oxidation Type of Reaction—Ferroous Metals—By A. G. Hotchkiss and H. M. Webber, General Electric Co.
- Prevention of Oxidation Type of Reaction in the Heat Treatment of Copper and Its Alloys—By E. G. deCorioli and Wm. Leher, Surface Combustion Corp.
- The Heat Treatment of the Chromium-Carbon Steels—By W. E. Mahin and W. C. Troy, Westinghouse Electric & Mfg. Co.
- Methods for Determining the Degree of Carbonization or Decarburization and Evaluating Controlled Atmospheres—By Norbert K. Koebel, Lindberg Engineering Co.
- Surface Effects Accompanying the Heating of Carbon Tool Steel in Oxidizing Atmospheres—By R. D. Stout and Toivo Aho, Lehigh University.
- Cost of Controlled Atmospheres—Equipment, Instruments and Operating—By Edward E. Slawter, Battelle Memorial Institute.
- Atmospheric Control in the Heat Treatment of Aluminum Products—By F. T. Strop, Aluminum Company of America.
- Atmospheric Control in the Heat Treatment of Magnesium Products—By C. E. Nelson, Dow Chemical Co.

ORDER TODAY

## AMERICAN SOCIETY FOR METALS

7301 Euclid Avenue

Cleveland, Ohio

## Hildorf Emphasizes Renewed Importance Of Alloy Steel Quality

Reported by R. A. Shattuck  
Laboratory Assistant, Crucible Steel Co.  
of America

Syracuse Chapter—In reviewing "Alloy Steels in the War Program" at the meeting on March 3, Walter Hildorf, chief metallurgist for the Timken Roller Bearing Co., Steel and Tube Division, emphasized the effort being made by steel producers to maintain high quality standards so that no time or material will be taken from war production through rejections.

To maintain these standards has necessitated a tremendous increase in metallurgical personnel and a return to the mills of service men who are familiar with the requirements of various applications.

### Necessity of Al in Steel Recognized

Vanadium is now considered practically unavailable, uses for chromium and nickel are highly restricted, but manganese, molybdenum and silicon are not critical as yet. Of importance to alloy steel producers is the recognition recently accorded the necessity of aluminum in steel making by the War Production Board.

While it is probably not generally realized, plain carbon scrap free from alloying elements is the most difficult to buy and it may soon become necessary to make scrap starting with pig iron.

There is, however, an abundance of low alloy chromium-nickel-molybdenum scrap and it is hoped that restrictions on grades which can be made from this scrap will be eased shortly.

Hardenability is one of the closest and best known measures of the character of a heat of steel. In many instances, consumers are placing too much emphasis on chemical analysis and grain size specifications, when the hardenability is actually the criterion of its suitability in many applications. Hardenability is especially valuable in checking the utilization of substitute materials.

Testing the hardenability of a heat of steel should be done in the laboratory under controlled conditions, since there are many influences exerted during the processing operations on items

## Chem and Met Laboratory Is Said to Be Important New Unit in Watch Industry

Reported by Albert J. Kleiner  
Foreman, Hamilton Watch Co.

York Chapter—The annual Gettysburg College meeting was held on March 11 at Hotel Gettysburg and Breidenbaugh Science Hall.

The replica of the President's bell was presented by Chairman Harry Hartman and received with gratitude by the members.

H. L. Hovis, works chemist of the Hamilton Watch Co., then delivered an illustrated lecture on chemistry and metallurgy as applied to the watch industry. The laboratory is a relatively new unit in the watch factory, with very few chemists employed until about 20 years ago. However, since that time, research and chemical engineers have become one of the important units of this industry.

The first part of the lecture dealt with chemical applications in the watch industry, and the requirements for materials to meet the very specialized needs were covered in detail. The process for salvaging precious metals was of particular interest.

### Gold Is Reclaimed

This included an illustration showing the "wet acid method" which is used in the plant for recovery of jewels and other materials. It was quite surprising to note the large amount of gold which is reclaimed from the different processes.

The cleaning of highly finished parts presents quite a problem in the watch industry since the final inspection is done with 18 power eye loupes and 60 power microscopes. Special cleaners were developed, and all chemical processes used throughout the plant are rigidly controlled by the laboratory.

The use of inhibitors for cleaning polished parts, and also the application of wetting agents for cleaning were outlined. Other processes of in-

such as gears, which might affect the hardness of the finished product.

In closing, Mr. Hildorf suggested that all consumers scrutinize their inspection set-ups to make sure they are making only the absolutely essential tests so that they will not hold up material that will satisfactorily do the job required of it.

terest were: Removal of broken screws from nickel silver parts without damage to the highly finished surfaces, removal of broken steel taps and drills, by chemical action, from copper-beryllium parts and other non-ferrous materials.

### Machining Problems Solved

In the metallurgical part of the lecture, it was brought out how, by careful cooperation and research, the difficult problems of machining ferrous and non-ferrous parts were solved. The application of special methods of inspection and testing has resulted in nearly 100% success.

The application of grain size and carbon particle size specifications was illustrated by photomicrographs, and it was explained that it is possible, in a great many cases, to predict the machining characteristics of these metals. This control can be considered a major problem because of the extremely close and exacting requirements of the finish and size tolerances.

The various methods used for the heat treatment of intricate parts were discussed. The manufacture of dies and tools for the watch industry is quite a problem, and very different from those found in conventional shops.

The speaker had an interesting exhibit of watch parts mounted in lucite and also large model parts in scales up to 100 to 1. The members were much enlightened by this splendid lecture of one of their own chapter, especially about the microscopic nature of the parts and the novel methods employed in solving problems in such a highly specialized industry.

## Heat Resisting Metals Cleveland Subject

Reported by Gerald M. Cover  
Associate Professor of Metallurgy  
Case School of Applied Science

Cleveland Chapter—The speaker at the regular monthly meeting on Jan. 5 was Joseph B. Shelby, foundry manager, Driver-Harris Co., who spoke on the subject of heat resisting metals. E. E. Thum, editor of METAL PROGRESS, acted as technical chairman.

Mr. Shelby traced the history of the industry noting that the use of nickel-chromium thermocouples suggested their use as heating elements. These alloys are very important for use as furnace and heat treating equipment parts. The temperatures considered were those above 1400° F., particularly in the range of 1600 to 1800°.

The 60% Ni, 12% Cr alloy has its chief use in the carburizing industry, as it resists both carburization and oxidation. The 35% Ni, 15% Cr alloy is used for furnace parts and fills a wide field in the low temperature industry, and in the non-ferrous field. 12% Ni, 26% Cr is good for medium temperatures in the oil industry, also in sheet annealing and normalizing equipment.

High nickel alloys cannot be used in sulphur atmospheres, nor with lead oxide. Certain alloys cannot be used for carburizing or protective atmospheres.

Savings in weight are made by the use of screen grids and perforated sheet for carburizing basket bottoms. Various shapes and castings fill the needs of the industry, and excellent welds can be made.

Interest in the meeting was shown by the discussion that followed. R. S. Archer was present as a guest for the evening. He gave an excellent short talk, interesting and to the point.

## Engineering Design On Different Basis In War Than Peace

Reported by Fred P. Peters  
Managing Editor, Metals and Alloys

New Jersey Chapter—Metal men shed a tear when it was announced that Harry W. McQuaid, of Republic Steel Corp. and W.P.B., scheduled to lecture on Feb. 16, was grounded by bad weather at a Cleveland airport and could not appear. But they quickly wiped it away when the ever-alert program committee replaced him with T. N. Armstrong, of the International Nickel Co.'s Development and Research Division, who informatively discussed "Alloy Steels" from the standpoint of their engineering properties and uses.

### Properties Reviewed

Over 150 members and guests profited by Mr. Armstrong's rapid-fire review of hardenability, tensile properties, high temperature behavior, low temperature properties, fatigue, corrosion resistance, and weldability, as provided by steels with different combinations of chromium, manganese, molybdenum, nickel, tungsten, and vanadium.

Mr. Armstrong pointed out that wartime engineering design is necessarily on a different basis from peacetime, particularly with respect to costs. And, although the properties of the different alloy steels may take on changed importance under new conditions, the actual values and service behavior of the familiar "standard" alloy steels must still be studied and understood for best utilization.

The talk contained several useful reminders—for example, that in small water-quenched pieces the hardness is a function of the carbon content, and is independent of the alloy, but that as the section size increases, full hardness is increasingly difficult to obtain as the alloy content goes down.

### Molybdenum Is Magic Metal

The magic metal for high temperature service is molybdenum, which is used almost universally, either alone or in combination with other alloys, for steels to serve in the range of 750 to 1100° F.

On the other hand, one of the most effective means of improving the low temperature impact properties of steel is by the addition of nickel, and this influence is exerted alike on cast and wrought steels of any carbon content and in any condition of heat treatment.

A bouquet was also tossed at the low alloy, high tensile structural steels (the mild alloy steels) which are increasingly used because of their combination of excellent forming qualities, good weldability, improved corrosion resistance, high yield strength and low alloy content. They permit reduction in dead weight without sacrifice of strength in many mobile products, including certain types of ordnance.

### Metals, Plastics Interdependent

Reported by Emil Gathmann, Jr.  
Gathmann Engineering Co.

Baltimore Chapter—At the February meeting Dr. A. Allan Bates, manager of the chemical and metallurgical division of Westinghouse Electric & Mfg. Co., was the guest speaker of the evening.

Dr. Bates' subject was introduced as "Plastics Vs. Metals", which he contradicted and explained that he would say "metals and plastics are colleagues", one being dependent upon the other. Dr. Bates then explained the development and use of plastics. His talk has been reported in previous issues of THE REVIEW.

## UNTIL MAY 1st Special Pre-Publication Saving

### HEAT FLOW IN METALS

By J. B. Austin, U. S. Steel Corp. Research Laboratory

140 pages . . 60 illustrations . .  
.. cloth binding . . \$2.00  
(after May 1—\$2.50)

Daily during the past Metal Congress a crowd of enthusiastic metal men gathered to hear Dr. Austin deliver his Educational Lecture series on Heat Flow in Metals.

Now this material is being gathered into one compact book which is available to ASM members at a special pre-publication price until May 1st. Dr. Austin first discusses the nature of heat and of metallic conduction, which

he illustrates with tables, charts and photographs. Then he relates the factors influencing the thermal conductivity of metals; the basic laws of heat conduction and heat flow in the steady state and in the unsteady state.

This book is written in language particularly designed for easy reading. Its many charts, tables and graphs make up a store of information which is obtainable at a glance. Write today for your copy at the special pre-publication saving!

American Society for Metals  
7301 Euclid Avenue  
Cleveland, Ohio



## Data on Fatigue and Stress Distribution in Air Engines Given

Reported by Walter G. Patton  
Climax Molybdenum Co.

Detroit Chapter—It should not be inferred that such items as government censorship and an out-of-focus projector can ruin an otherwise highly successful A.S.M. technical meeting. Aside from these minor considerations, the February meeting was all that could be asked for.

The new meeting place is the Horace H. Rackham Educational Memorial Building. The dining service and the food established a new standard of excellence, and the acoustics of the auditorium, the lighting system, and the public address system are splendid.

The speaker of the evening was R. L. Heath, chief metallurgist, Allison Engine Division of General Motors Corp. It is no criticism of the speaker to say that he kept his discussion strictly along general lines. Specific design data of the Allison motor were scrupulously avoided.

Mr. Heath outlined the chemical and physical requirements of a number of metallic engine parts and discussed the reasons for their selection. Considerable data on fatigue characteristics of metals and stress distribution were included in his talk.

The behavior of non-metallic elements including synthetic rubber, engine enamel and non-metallic, corrosion resistant finishes was considered. The relationship of materials to production problems also received attention.

The coffee talk was given by R. E. Bratton, chairman of the Speakers' Bureau, Detroit Junior Bar Association, on "How to Prepare Your Income Tax Report".

## Experience and Judgment Required In Testing Forgings

Reported by F. N. Meyer  
Technical Supervisor, Waterbury Branch  
American Brass Co.

New Haven Chapter—At the February meeting held at Hammond Laboratory, Yale University, A. O. Schaefer, engineer of tests of The Midvale Co., Nicetown, Philadelphia, spoke on "Testing and Inspection".

The technical chairman of the evening was Stuart E. Sinclair, metallurgist of the Geometric Tool Co.

Mr. Schaefer discussed some of the problems and methods associated with the inspection of large forgings. When testing for the compliance with specifications the following questions arise as to the correct procedure:

Are the test specimens located correctly?

Can the results of a longitudinal test specimen be compared with those on a transverse specimen?

Are the properties of an appendage representative of the properties of the larger section?

Will the test give information as to the performance of the forging in its final application?

Mr. Schaefer discussed these questions revealing the importance of experience and judgment in the inspection and testing of large forgings.

The testing of turbine rotors for deformation at the temperature and speed which they will be in service was shown. Tests of this type have been of great assistance in developing improved materials for such applications.

The coffee talk preceding the lecture by W. P. Moran of the F. B. I. found an appreciative audience.

## HERE AND THERE WITH A.S.M. MEMBERS

ARDEN L. KNIGHT, past chairman of the Boston Chapter A.S.M. and currently a member of the Executive



A. L. Knight

Committee and a member of the national By-Laws Committee, has been called into active service with the U.S. Navy Bureau of Ordnance as lieutenant commander.

Mr. Knight was formerly New England sales manager for Wheelock-Lovejoy & Co., Inc., of Cambridge, Mass., and immediately prior to returning to active duty was in the Latrobe Electric Steel Co.'s Hartford office.

Before entering steel sales work he was engaged in operating capacities with Republic Steel Corp. and Wheeling Steel Co. He is a graduate of the School of Mining and Metallurgy at Ohio State University, class of 1917. He saw service with the Navy in World War I.

Mr. Knight is now in the production division of the Navy Bureau of Ordnance at Washington, D. C.

TEMPORARY leave of absence to assist the War Department in the production of ammunition has been granted to A. C. CARLTON, curator of fuels and metals at the Museum of Science and Industry, Chicago. Mr. Carlton's assignment is in the small fuze and primer section, ammunition division, Chicago Ordnance District.

A graduate of Massachusetts Institute of Technology, Mr. Carlton served in the World War of 1917-18 as a captain of infantry in the United States Army. Following the war he joined the engineering staff of Phelps-Dodge Corp. at Douglas, Ariz., and later transferred to similar duties for the Chile Copper Co. at Chuquibambilla, Chile. After two years there he joined the Baltimore Smelting Co., rising to general superintendent of the plant. He came to Chicago in the spring of 1932, in time to aid in developing the Museum's famous coal mine. He is a member of the Chicago Chapter.

MAURICE C. FETZER, formerly assistant professor of metallurgy at Pennsylvania State College, has joined the staff of the Carpenter Steel Co. as a research metallurgist.

He is a graduate metallurgical engineer from the University of Minnesota, and received the degree of Sc.D. from Harvard University. He is a member of the American Society for Metals, American Institute of Mining and Metallurgical Engineers, and British Iron and Steel Institute.



M. C. Fetzer

APPOINTMENT of FRANK T. BUMBAUGH as assistant manager of sales, alloy division, has been announced by Carnegie-Illinois Steel Corp. Mr. Bumbaugh was formerly metallurgical engineer, bar and semi-finished products, in Pittsburgh.

Mr. Bumbaugh is a member of the A.S.M. and has served as chairman, Shell Steel Committee, and a member of the Technical Committee on Government Specifications, and the Carbon Bar and Semi-finished Committee, American

Iron and Steel Institute. He has also been a member of the Iron and Steel Division of the Standards Committee of the Society of Automotive Engineers, and has recently been a member of the Sucker Rod and Concrete Reinforcing Bar Committee of the War Production Board.

A native of Monessen, Pennsylvania, Mr. Bumbaugh began his employment in the Carnegie-Illinois Steel Corporation in 1926 at the Duquesne Works, two years after his graduation from Lehigh University with a degree of metallurgical engineer.

PAUL KELLER has been appointed to manage the sales of tool, stainless, and special steels for the Copperweld Steel Co., Warren, Ohio. This special department has been created to meet the heavy demand for this type of materials.

Mr. Keller is a graduate of the University of Tennessee, and before being advanced to his new post was manager of Copperweld's Cleveland sales district, where he is a member of the local A.S.M. Chapter.



Paul Keller

LEAVE of absence to accept a lieutenant's commission in the United States Navy has been granted to R. S. AHLBRANDT, Pittsburgh district sales manager for Allegheny Ludlum Steel Corp., a member of the Pittsburgh Chapter.

Mr. Ahlbrandt was a graduate of Annapolis and a member of the Naval Reserve. He was the Pittsburgh district sales manager for Ludlum Steel Co. before its merger with Allegheny, and became assistant sales manager in the district when the two companies joined, later moving up to the managership.



R. S. Ahlbrandt

NATIONAL A.S.M. Vice-President HERBERT J. FRENCH has been appointed senior technical consultant in charge of the Metallurgical and Specifications Section of the Iron and Steel Branch, War Production Board. Mr. French is in charge of alloy steel and iron development, International Nickel Co., New York City.

## Answers to Questions On Microscopy Applauded

Reported by Dennis J. Carney  
Pennsylvania State College

Penn State Chapter—On Feb. 19, L. V. Foster of the Bausch & Lomb Optical Co. spoke on "The Optics of the Metallurgical Microscope".

Using numerous slides to illustrate each point, the speaker discussed the advantages and disadvantages of the many types of microscopes used by metallurgists.

The two main types of illumination discussed were critical illumination with plane glass reflector, and the polarizing vertical illumination. The effects of each type on polished specimens were also shown.

A hit of the evening was the fine explanation of the questions asked concerning some of the practical aspects of the use of metallurgical microscopes.

## ★ HARDNESS ★ AND HARDNESS MEASUREMENTS

A New Book at Special Pre-Publication Price  
Until May 1

By Prof. S. R. Williams, Amherst College

550 pages . . . 340 illus. . . 6 x 9 . . .  
red cloth binding.

SPECIAL PRE-PUBLICATION PRICE

\$6.00 (after May 1—\$7.50)

Since the days of the last World War the author has been engaged in the study of hardness. Thus, it was only natural that his lecture series on this subject at the National Metal Congress attracted wide attention.

Now this material is collected into a compact, profusely illustrated book—a "Bible" for all interested in hardness testing. There is so much information in this book that you will want to keep it by you as a constant reference source for anything pertaining to hardness testing.

Reserve your copy today at the special pre-publication saving.

AMERICAN SOCIETY FOR METALS

7301 Euclid Ave.

Cleveland, O.

## Rapid Progress in Production of Sheet For Deep Drawing

Reported by Edward Troy  
Inland Steel Co.

Calumet Chapter—H. L. von Ende, chief metallurgist and inspector of Carnegie-Illinois' Gary Sheet and Tin Mills, Gary, Ind., discussed "The Manufacture and Testing of Deep Drawing Sheet Steel" at the February meeting.

The speaker traced the processing of cold-rolled sheet steel from the ingot to the finished product, stressing particularly the effect of different operations on the final properties of the sheet. He pointed out that in the last few years rapid progress has been made in the production of sheets able to withstand deep draws.

The development of bearings capable of enduring the extreme loads, and the adoption of the four-high rolling principle, hastened the progress of this manufacturing method. These mills laid the groundwork for the production of vast tonnages of sheet steel which had drawing properties superior to those of the earlier sheets.

### Grain Size Important

Grain size of the finished sheet is one of the most important of the common tests used to determine the suitability of sheets to a particular forming job. Control of this factor can be effected through control of the hot strip mill finishing temperature, coiling temperature, amount of cold reduction, and the annealing temperature.

Slides showing deep-drawn parts which had been drawn from scribed blanks gave the audience revealing information as to the amount of stretch and compression taking place during the drawing of several parts such as automotive fenders and hood tops.

Stretcher strains will be developed in sections of parts involving relatively little draw if the sheets have not been specially treated to avoid this hazard. Their appearance is prevented by skin rolling as a last step in production, and a pass through a roller leveler shortly before the sheet is drawn.

Mr. von Ende discussed the different methods of testing the drawing properties of sheets, giving the advantages and limitations of each. Hardness, tensile, Olsen draw tests, and microscopic examination all give some indication of the drawability of a sheet, but the best criterion is a study of the performance record on each part.

by H. J. French, In Charge of Alloy Steel and Iron Development, International Nickel Co.

MR. FRENCH'S lectures on "Alloy Constructional Steels" were so well received at the 1941 Western Metal Congress that they have been made into a book.

This 275-page book covers alloys in commercial steels—why alloy steels are used—selection of alloy steels—typical commercial uses—commercial steels and manufacturing vari-

Published by

American Society for Metals  
7301 Euclid Avenue  
Cleveland, Ohio

## CHAPTER CALENDAR

CHAPTER	DATE	PLACE	SPEAKER	SUBJECT
Boston	May 1			Annual Meeting
Buffalo	May 14			Annual Meeting
Calumet	May 19	Woodmar Country Club, Hammond, Ind.	J. D. Corfield	Heat and Corrosion Resistant Castings
Calumet	June 13			Golf Stag
Canton-Mass.	June 19			Summer Party
Chicago	May 14	Chicago Bar Assoc.		Metallurgical Information Please
Cincinnati	June 5			Heat Treating and Problems Created by Substitute Materials (Tri-Chapter Meeting)
Cleveland	May 4	Cleveland Club	Stanley P. Watkins	Relation of Stainless Steel to National Defense
Columbus	June 5	Cincinnati, Ohio		Tri-Chapter Meeting
Dayton	May 13	Engineers Club	N. K. Koebel	Heat Treating Furnaces
Dayton	June 5	Cincinnati, Ohio		Tri-Chapter Meeting
Detroit	May 11		H. J. French	Nickel Alloy Steels
Detroit	June 20			Annual Outing
Hartford	May 12	Hart. Elec. Light Co.	W. J. Conley	Relation of Internal Structure of Metals to Their Practical Performance
Hartford	June 9			Annual Outing
Indianapolis	May 18	Washington Hotel		Round Table Discussions
Indianapolis	June 6			Annual Golf Tournament
Los Angeles	May			Welding of Aluminum
Milwaukee	May 19	Athletic Club		Annual Party
New Haven	June 6			Annual Outing
New Jersey	May 18	Essex House, Newark	R. R. Moore	Metal Failures, Their Causes and Corrections
New York	May 11	Bldg. Trade Employers Assoc. Clubroom	V. T. Malcolm	Valve Metallurgy
North West	May 18			Annual Meeting
Northwest Pa.	May 14	Meadville		Substitute Materials
Notre Dame	May 13	Engineering Audit, Univ. of Notre Dame	V. O. Homerberg	Nitriding and Its Industrial Applications
Ontario	May 1	Hamilton	O. V. Horger	What the Metallurgist Should Know About Design
Ontario	May 15	St. Catharines		Austempering
Peoria	May 11			Election of Officers—Movies
Philadelphia	June 5			Annual Meeting and Outing
Pittsburgh	May 14	Roosevelt Hotel	John Golden	Manufacture of Open Hearth Steel
Puget Sound	May 5	Frye Hotel	John Mitchell	Selection and Conservation of Alloying Elements in Steels
Rhode Island	June			Annual Outing
Rochester	May 11	Todd Union, Univ. of Rochester		Annual Meeting
Rocky Mtn. Group	May 15	Oxford Hotel		Annual Meeting
Saginaw Valley Group	May 19	Country Club, Midland, Mich.	M. J. Caserio	Bearings and Bearing Metals
Schenectady	May 12		L. B. Lindemuth	Steel Industry in Australia
Springfield	May 18	Hotel Sheraton	N. K. Koebel	Industrial Controlled Atmospheres
Syracuse	May 8	Onondaga Hotel	L. C. Conradi	Flame and Induction Hardening
Texas	May 21	River Oaks Country Club	Norbert K. Koebel	Heat Treating Hints
Toledo Group	May 25	Hillcrest Hotel	A. Allan Bates	Metals Vs. Plastics
Tri-City	May 12	Hotel Ft. Armstrong, Rock Island, Ill.	A. Allan Bates	Plastics for the Metallurgist
Worcester	May 22			New England Regional Meeting
York	May 8			Annual Meeting
York	July 11			Annual Picnic

### B. C. and Chicago Members Die

ROBERT MCPHAIL, president, Wm. McPhail & Sons (Canada), Ltd., and a member of the Executive Committee, British Columbia Chapter, died on February 13.

CARL PFANSTIEHL of the Chicago Chapter A.S.M., vice-president and director of research of Pfanstiehl Chemical Co., Waukegan, Ill., died on February 28.

### Effect of Size Shown In Fatigue Studies

Reported by C. A. Nagler

Instructor, University of Minnesota

Northwest Chapter—Dr. O. J. Horger, who is in charge of railway engineering and research at the Timken Roller Bearing Co., Canton, Ohio, was the speaker at the March meeting of A.S.M. His lecture on "Fatigue of Metals" was illustrated with a number of slides showing fatigue failures of various machine parts which occurred in service. Each case was discussed and then the proper solution for the difficulty was presented.

Results from laboratory investigations were given for small specimens 0.3 in. diameter and compared with those from large members 7 in. diameter. Considerable emphasis was given to the lower fatigue values found for full size members over the scale size conventionally used.

While size effect offers some explanation for the lower fatigue values, the influence of processing conditions associated with large members was presented as having an important bearing on this difference in fatigue strength.

After these introductory remarks, Dr. Horger illustrated the use of photoelastic methods in determining stress concentrations in a finished machine part on a series of slides. The description was elemental enough so that there was very little difficulty on the part of the audience in following this complicated method of stress determination and analysis.

### Tri-Chapter Meeting to Stress Exchange of Ideas

Various technical societies and associations throughout the country have announced numerous meetings and conventions to be held this spring. This is convincing proof of the importance attached by these groups to maintaining an American tradition now more than ever—namely, "the interchange of ideas to promote progress."

An important meeting of this type is the Tri-Chapter meeting of the A.S.M., now reinstated and scheduled for Friday, June 5, 1942, in Cincinnati. This meeting will consist of a series of talks on heat treating and heat treating problems using the regular steels and as created by substitute materials.

Those who are having any problems in connection with manufacture of war products may find just the solution at this meeting. Mark your calendar now and plan to attend.

### Frederick H. Franklin Dies

FREDERICK H. FRANKLIN, chemist and chairman of the board of directors of the Fram Corp., of East Providence, died suddenly at the wheel of his car on March 18. Mr. Franklin, who was 68, was one of the organizers of the Fram Corp. He was an active member of the Rhode Island Chapter of the A.S.M., as well as of the Providence Engineering Society and the American Chemical Society.

### Employment Bureau

Address answers care of A. S. M., 7301 Euclid Ave., Cleveland, unless otherwise stated.

#### Positions Open

METALLURGIST: Capable of overseeing the production of straight carbon and alloy steel castings, electric furnace. Steel foundry located in eastern Pennsylvania. In reply state age, experience and salary desired. Box 4-5.

METALLURGISTS, hydro-metallurgists, and chemical engineers with milling experience, mechanical engineers and welding engineers. For research on problems relating to war industries. Write Battelle Memorial Institute, Columbus, Ohio.

TECHNOLOGISTS: The number of persons on the employment lists of the Federal Civil Service Commission in this branch is not sufficient for today's wartime needs, and the Commission has renewed the announcement of these openings. Salaries range from \$2000 to \$5600 a year. The maximum age limit has been raised to 60 years. Applications may be filed until further notice with the Commission's Washington office.

NON-FERROUS CHEMIST: Experienced man for permanent position in analysis of brass, bronze, bearing metals, aluminum, and magnesium. Knowledge of ferrous, organic, and miscellaneous analysis desirable. State in first letter full experience, background, and approximate salary expected. Middle west location. Correspondence strictly confidential. Inquiries desired from qualified applicants only. Box 2-5.

METALLURGIST: Young graduate with practical knowledge of the processing of stainless steels. Should be competent in metallography and experienced in the investigation of metallurgical problems of stainless steels in production and in the field. Give training and experience. Box 4-10.

FORGING AND HEAT TREATING EXPERT: Divisional production man, practical expert on forging and heat treating. To organize installation and supervise operation of complete department in a Chicago area sheet metal plant. Rated AAA-1. Must have executive ability. Engineering graduate, over 30. Permanent future assured for right man. State salary wanted and full details of experience. Box 4-15.

METALLOGRAPHIST: To do investigational work, or direct metallographic department in laboratory of large, vital defense industry. Should have exceptional training, or thorough background in metallography of ferrous metals. State experience, education, references and salary desired. Box 4-20.

METALLURGICAL CHEMIST: At least ten years experience in laboratory control work. Must know chemical methods for all steels, brass and bronze and other non-ferrous metals, also oils. To act as chief chemist for torpedo plant in Chicago and act in advisory capacity for a second plant. Also a man to handle the physical testing end in the laboratory, with at least five years experience. Box 4-25.

#### Position Wanted

METALLURGIST: Physicist, chemist, industrial engineer. Executive experience in process and production. Authority on X-ray, magnetic inspection, foundry practice and fabrication. Minimum salary \$10,000. Age 37, draft classification 3-A. Present location Pacific Coast. Box 4-30.

## ALLOY CONSTRUCTIONAL STEELS

275 pages . . . 95 illustrations . . . 6" x 9" . . . Cloth binding . . . \$4.00

ables—high alloy steels—wear—how alloying elements may affect corrosion of steels—processing and special treatments. In a time when much of our steel is being used for construction, the valuable information contained in this book is particularly important and timely. Order your copy today.



**o**  
**as**

nd asso-  
y have  
nd con-  
This  
ortance  
aintain-  
w more  
ange of

is type  
of the  
cheduled  
cinnati.  
eries of  
t treat-  
steels  
terials.  
roblems  
of war  
tion at  
ar now

**Dies**

chemist  
rectors  
vidence,  
his car  
was 68,  
Fram  
ber of  
A.S.M.,  
gineer-  
hemical

**u**

**Euclid**  
**ated.**

reeding  
a alloy  
ountry  
reply  
desired.

ts, and  
rience,  
ineers.  
o war  
Insti-

ersons  
l Civil  
is not  
nd the  
ement  
from  
m age  
pplica-  
e with

rienced  
rgsis of  
ninum,  
ts, or-  
vivable.  
back-  
ected.  
trictly  
quali-

with  
ng of  
ent in  
ne in-  
ms of  
n the  
Box

EX-  
actical  
To or-  
ion of  
sheet  
execu-  
er 30.  
State  
rience.

estiga-  
depart-  
nse in-  
ng, or  
of fer-  
n, ref-

least  
control  
for all  
ferrous  
ist for  
visory  
man to  
labora-  
e. Box

st, in-  
ace in  
X-ray,  
d fab-  
ge 37,  
ocation